US 20210072833A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0072833 A1**

Mutlu et al. (43) **Pub. Date: Mar. 11, 2021**

(54) **SELF-MIXING INTERFEROMETRY-BASED GESTURE INPUT SYSTEM INCLUDING A WEARABLE OR HANDHELD DEVICE**

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(21) Appl. No.: **16/934,988**

(22) Filed: **Jul. 21, 2020**

Related U.S. Application Data

(60) Provisional application No. 62/896,801, filed on Sep. 6, 2019.

Publication Classification

(51) **Int. Cl.**
G06F 3/01 (2006.01)
G01S 17/50 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 3/017*** (2013.01); ***G01S 17/50*** (2013.01); ***G06F 3/014*** (2013.01)

(57) **ABSTRACT**

A wearable device includes a device housing configured to be worn on a first surface of a user, a set of one or more SMI sensors, and a processor. The set of one or more SMI sensors is mounted within the device housing and configured to emit a set of one or more beams of electromagnetic radiation, with each beam emitted in a different direction extending away from the first surface. The set of one or more SMI sensors is also configured to generate a set of one or more SMI signals containing information about a relationship between the device housing and a second surface. The processor is configured to extract the relationship between the device housing and the second surface from digitized samples of the set of one or more SMI signals.